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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,305	03/13/2004	Zhen Liu	YOR920040072US1	8285

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EXAMINER	
MATTIS, JASON E	

ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/800,305	LIU ET AL.	
	Examiner	Art Unit	
	JASON E. MATTIS	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-18 and 21-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-8,10-12,15-18,21-23,25-27 and 30-36* is/are rejected.

7)☒ Claim(s) *9,13,14,24,28 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1 paper*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed 2/4/08. Due to the Applicant's arguments, the previous rejections under 35 U.S.C. 101 have been withdrawn. Claims 4, 5, 19, and 20 have been cancelled. Claims 1-3, 6-18, and 21-36 are currently pending in the application.

2. The indicated allowability of the subject matter of previous claims 4, 5, 19, and 20 is withdrawn in view of the newly discovered reference(s) to Galkowski et al. (U.S. Pat. 6259988 B1). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamping et al. (U.S. Pat. 5619632) in view of the Shi et al. paper titled "Routing in Overlay Multicast Networks" (as cited in the Applicant's IDS) and in further view of Galkowski et al. (U.S. Pat. 6259988 B1).

With respect to claims 1 and 16, Lamping et al. discloses a computer readable medium containing a computer executable code that causes a computer to perform a method **(See column 16 lines 1-36 and Figure 5 of Lamping et al. for reference to a CPU 202 executing a program stored in a computer readable medium to perform a method)**. Lamping et al. also discloses identifying a plurality of nodes and mapping the nodes into multidimensional space **(See column 17 lines 19-43 and Figure 6 of Lamping et al. for reference to obtaining data on nodes and mapping the nodes to a layout space, which is a two-dimensional plane)**. Lamping et al. further discloses constructing a geometric region comprising a size that is the minimum size necessary to contain the source and all the nodes **(See column 11 lines 18-42, column 13 lines 50-65 and Figure 2 of Lamping et al. for reference to defining a convex hull that is a minimum size containing all the nodes)**. Lamping et al. discloses creating a grid within the geometric region **(See column 20 lines 16-60 and Figure 9 of Lamping et al. for reference to mapping the nodes to coordinates, which form a grid, within the hyperbolic plane)** Lamping et al. also discloses creating a tree beginning at the source and including all of the nodes within the geometric region **(See column 24 lines 42-65 and Figure 14-21 of Lamping et al. for reference to creating a tree beginning at a source node and including all the nodes in the convex hull)**. Lamping et al. does not specifically disclose that the tree is an overlay multicast tree. Lamping et al. also does not specifically disclose the grid containing a plurality of cells such that all of the cells comprise a substantially equivalent amount of area.

With respect to claims 1 and 16, Shi et al., in the field of communications, discloses using a geometric mapping of nodes to create a tree that is an overlay multicast tree **(See the abstract, Section IV A. titled "Simulation Setup", and Figure 3 of Shi et al. for reference to using a geometric mapping of nodes in an overlay network to create a multicast tree)**. Using a geometric mapping of nodes to create a tree that is an overlay multicast tree has the advantage of allowing data to be efficiently multicast in an overlay network.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Shi et al., to combine using a geometric mapping of nodes to create a tree that is an overlay multicast tree, as suggested by Shi et al., with the system and method of Lamping et al., with the motivation being to allow data to be efficiently multicast in an overlay network.

With respect to claims 1 and 16, Galkowski et al., in the field of communications, discloses a grid containing a plurality of cells such that all the cells comprise a substantially equivalent amount of area **(See column 4 line 44 to column 5 line 11 and Figure 1 of Galkowski et al. for reference to a route planning algorithm including the step of creating a grid containing a plurality of regular shapes, which correspond to cells comprising a substantially equivalent amount of area)**. Using a grid containing a plurality of cells such that all the cells comprise a substantially equivalent amount of area has the advantage of making route calculations more simplified as opposed to using irregularly sized cells **(See column 4 lines 53-55 of Galkowski et al. for reference to this advantage)**.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when provided with the work of Galkowski et al., to combine using a grid containing a plurality of cells such that all the cells comprise a substantially equivalent amount of area, as suggested by Galkowski et al., with the system and method of Lamping et al. and Shi et al. with the motivation being to make route calculations more simplified.

With respect to claims 2 and 17, Lamping et al. discloses constructing a circular region **(See column 20 lines 16-60 and Figure 9 of Lamping et al. for reference to defining the space by a circle)**.

With respect to claims 3 and 18, Lamping et al. discloses mapping the nodes into multidimensional Euclidean space **(See column 17 lines 20-43 and Figure 6 of Lamping et al. for reference to mapping the nodes into a hyperbolic plane, which is a Euclidean space)**.

3. Claims 6-8, 10, 21-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamping et al. in view of Shi et al. and Galkowski et al. as applied to claims 1-3 and 16-18 above, and further in view of Madruga et al. (U.S. Publication US 2001/0034793 A1).

With respect to claims 6, 7, 21, and 22, the combination of Lamping et al., Shi et al., and Galkowski et al. does not specifically disclose selecting a representative node, which is a node in a cell closest to the source, for each cell containing at least one node and connecting first to the representative nodes.

With respect to claims 8, 10, 23, and 25, the combination of Lamping et al., Shi et al., and Galkowski et al. does not specifically disclose connecting to additional nodes within each cell by connecting the representative node to a second node in the cell and using the second node to connect to the outer representative nodes.

With respect to claims 6-8, 10, 21-23, and 25, Madruga et al., in the field of communications, discloses selecting a representative node, which is a node in a cell closest to the source, for each cell containing at least one node and connecting first to the representative nodes and connecting to additional nodes within each cell by connecting the representative node to a second node in the cell and using the second node to connect to the outer representative nodes **(See the abstract, page 5 paragraphs 82-90, and Figure 1 of Madruga et al. for reference to a multicast tree structure being created by selecting an anchor router (i.e. router g is an anchor router for router f), which is a representative router closest to the source, for a group of routers, connecting the anchor router a second router in the group, and connecting the second router to two other routers (i.e. connecting router f to routers e and j) that are in areas farther from the source)**. Connecting nodes in this manner has the advantage of efficiently forming a multicast tree structure.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when provided with the work of Madruga et al., to combine connecting nodes as suggested by Madruga et al., with the system and method of Lamping et al., Shi et al., and Galkowski et al., with the motivation being to efficiently form a multicast tree structure.

4. Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamping et al. in view of Shi et al., Galkowski et al., and Madruga et al. as applied to claims 6-8, 10, 21-23, and 25 above, and further in view of Jain et al. (U.S. Publication US 2005/0111386 A1).

With respect to claims 11 and 26, the combination of Lamping et al., Shi et al., Galkowski et al., and Madruga et al. does not specifically disclose using a constant factor approximation algorithm.

With respect to claims 11 and 26, Jain et al. discloses using a constant factor approximation algorithm **(See page 2 paragraph 17 of Jain et al. for reference to using a constant-factor approximation algorithm when forming a routing tree structure)**. Using a constant factor approximation algorithm has the advantage of being a substantially optimum algorithm to produce a constant fraction of trees **(See page 2 paragraph 17 of Jain et al. for reference to this advantage)**.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when provided with the work of Jain et al., to combine using a constant factor approximation algorithm, as suggested by Jain et al., with the system and method of Lamping et al., Shi et al., Galkowski et al., and Madruga et al., with the motivation being to use substantially optimum algorithm to produce a constant fraction of trees.

5. Claims 12 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamping et al. in view of Shi et al. and Galkowski et al. as applied to claims 1-3 and 16-18 above, and further in view of Sustanto (U.S. Pat. 6668226 B2).

With respect to claims 12 and 27, the combination of Lamping et al., Shi et al., and Galkowski et al., does not specifically disclose constructing a polar grid.

With respect to claims 12 and 27, Sustanto, in the field of communications, discloses constructing a polar grid **(See the abstract and column 2 lines 37-50 of Sustanto for reference to dividing a plurality of mapped routing nodes using a polar grid including polar grid cells).** Constructing a polar grid has the advantage of making it easier to calculate differences in routing times between nodes.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when provided with the work of Sustanto, to combine constructing a polar grid, as suggested by Sustanto, with the system and method of Lamping et al., Shi et al., and Galkowski et al., with the motivation being to make it easier to calculate differences in routing times between nodes.

6. Claims 15 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamping et al. in view of Shi et al. and Galkowski et al. as applied to claims 1-3 and 16-18 above, and further in view of Alkalai et al. (U.S. Pat. 7020076 B1).

With respect to claims 15 and 30, the combination of Lamping et al., Shi et al., and Galkowski et al. does not disclose using an out-degree less than two for each node in the tree.

With respect to claims 15 and 30, Alkalai et al., in the field of communications, discloses using a out-degree less than two for each node in a tree **(See column 14 lines 9-47 and Figures 6A-D of Alkalai et al. for reference to using a stack tree with each node being connected to at most three nodes with at most two being branch, or out, nodes)**. Using an out-degree less than two for each node in a tree has the advantage of simplifying the routing of data through the tree while making sure that available bandwidth is not overused in any node of the tree.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Alkalai et al., to combine using a out-degree less than two for each node in a tree, as suggested by Alkalai et al., with the system and method of Lamping et al., Shi et al., and Galkowski et al., with the motivation being to simplify the routing of data through the tree while making sure that available bandwidth is not overused in any node of the tree.

7. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alkalai et al. in view of Shi et al. and Galkowski et al.

With respect to claim 31, Alkalai et al. discloses a network comprising source having an out-degree of no more than ten and a plurality of nodes in communication with the source with each node having an out-degree of no more than ten **(See column 14 lines 9-47 and Figures 6A-D of Alkalai et al. for reference to a network having using a stack tree having a source node and other nodes in communication with the source node with each node being connected to at most three nodes with at**

most two being branch, or out, nodes). Alkalai et al. does not specifically disclose that the network is an overlay network. Alkalai et al. also does not specifically disclose mapping nodes into a grid containing a plurality of cells such that all of the cells comprise a substantially equivalent amount of area.

With respect to claim 31, Shi et al. discloses using a geometric mapping of nodes to create a tree in an overlay network **(See the abstract, Section IV A. titled "Simulation Setup", and Figure 3 of Shi et al. for reference to using a geometric mapping of nodes in an overlay network to create a multicast tree)**. Using a geometric mapping of nodes to create a tree that is an overlay multicast tree has the advantage of allowing data to be efficiently multicast in an overlay network.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Shi et al., to combine using a geometric mapping of nodes to create a tree that is an overlay multicast tree, as suggested by Shi et al., with the system and method of Alkalai et al., with the motivation being to allow data to be efficiently multicast in an overlay network.

With respect to claim 31, Galkowski et al., in the field of communications, discloses mapping nodes into a grid containing a plurality of cells such that all the cells comprise a substantially equivalent amount of area **(See column 4 line 44 to column 5 line 11 and Figure 1 of Galkowski et al. for reference to a route planning algorithm including the step of creating a grid containing a plurality of regular shapes, which correspond to cells comprising a substantially equivalent amount of area)**. Using a grid containing a plurality of cells such that all the cells comprise a substantially

equivalent amount of area has the advantage of making route calculations more simplified as opposed to using irregularly sized cells **(See column 4 lines 53-55 of Galkowski et al. for reference to this advantage)**.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when provided with the work of Galkowski et al., to combine using a grid containing a plurality of cells such that all the cells comprise a substantially equivalent amount of area, as suggested by Galkowski et al., with the system and method of Alkalai et al. and Shi et al. with the motivation being to make route calculations more simplified.

With respect to claim 32, Alkalai et al. discloses the nodes each having an out-degree of no more than two **(See column 14 lines 9-47 and Figures 6A-D of Alkalai et al. for reference to a network having using a stack tree having a source node and other nodes in communication with the source node with each node being connected to at most three nodes with at most two being branch, or out, nodes)**.

8. Claims 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alkalai et al. in view of Shi et al. and Galkowski et al. as applied to claims 31 and 32 above, and in further view of and Lamping et al.

With respect to claim 33, the combination of Alkalai et al., Shi et al., and Galkowski et al. does not disclose mapping nodes into a geometric region in multidimensional space having a size that is the minimum size necessary to contain the source and all the nodes.

With respect to claim 34, the combination of Alkalai et al., Shi et al., and Galkowski et al. does not disclose that the multidimensional space is Euclidean space.

With respect to claim 35, the combination of Alkalai et al., Shi et al., and Galkowski et al. does not disclose that the region is a circle.

With respect to claims 33-35, Lamping et al. discloses mapping nodes into a circular geometric region in multidimensional Euclidean space having a size that is the minimum size necessary to contain the source and all the nodes **(See column 11 lines 18-42, column 13 lines 50-65, column 20 lines 16-60, and Figures 2 and 9 of Lamping et al. for reference to defining a convex hull that is a minimum size containing all the nodes and for reference to defining the space by a circle which is a multidimensional Euclidean space)**. Mapping nodes into a circular geometric region in multidimensional Euclidean space having a size that is the minimum size necessary to contain the source and all the nodes has the advantage of allowing a tree to be efficiently formed.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Lamping et al., to combine mapping nodes into a circular geometric region in multidimensional Euclidean space having a size that is the minimum size necessary to contain the source and all the nodes, as suggested by Lamping et al., with the system and method of Alkalai et al., Shi et al., and Galkowski et al., with the motivation being to allow a tree to be efficiently formed.

With respect to claim 36, Alkalai et al. does not disclose that the region is a sphere.

With respect to claim 36, Shi et al. discloses using a region that is a sphere **(See the abstract, Section IV A. titled "Simulation Setup", and Figure 3 of Shi et al. for reference to using a spherical geometric mapping of nodes in an overlay network to create a multicast tree)**. Using a region that is a sphere has the advantage of allowing data to be efficiently mapped into a multicast tree in an overlay network.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Shi et al., to combine using a region that is a sphere, as suggested by Shi et al., with the system and method of Alkalai et al., with the motivation being to allow data to be efficiently mapped into a multicast tree in an overlay network.

Allowable Subject Matter

9. Claims 9, 13, 14, 24, 28, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON E. MATTIS whose telephone number is (571)272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on (571)272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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